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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,752	11/13/2003	Sandeep K. Karode	47321-S6367	8900
20454	7590	08/15/2005	EXAMINER	
JEFFREY C. LEW 2205 SILVERSIDE ROAD WILMINGTON, DE 19810			LAWRENCE JR, FRANK M	
			ART UNIT	PAPER NUMBER

1724

DATE MAILED: 08/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/712,752

Applicant(s)

KARODE ET AL.

Examiner

Frank M. Lawrence

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by

O'Brien et al. (4,681,612).

3. O'Brien et al. '612 teach a process for separating methane from landfill feed gas that includes methane, carbon dioxide and heavy hydrocarbons, comprising compressing the feed gas in a compressor (160), removing water in a dehydrator (170), conveying the dehydrated gas to a high-pressure, low temperature distillation column (174), removing condensed carbon dioxide containing heavy hydrocarbons from the bottom of the column (176), removing a gas mixture including carbon dioxide and methane from the top of the column (178), conveying the gas mixture to a membrane separator (180) that can include a series of membranes having a permeate chamber and retentate chamber, removing separated methane from the retentate chamber (182), removing separated carbon dioxide from the permeate chamber (184), compressing the separated carbon dioxide in a compressor (186), and feeding the compressed carbon dioxide back to the distillation column through a recycle line (188) where it is recondensed in the column (figure, col. 4, lines 1-20, col. 6, lines 20-54, col. 7, line 63 to col. 8, line 55). The distillation column includes separation stages, trays or backing with a reboiler and a condenser (cooling coil 190) to produce a liquid carbon dioxide that will enter the column where it is condensed and pass

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countercurrently with entering heavy hydrocarbons, and operates at 200-900 psia and above  $-70^{\circ}$  F (col. 6, lines 44-68).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien et al. '612 in view of Burr (4,793,841).

6. O'Brien et al. '612 disclose all of the limitations of the claim except that the feed point of the column is at an elevation above the bottom and below mid-height of the column. Burr '841 discloses an absorption column for separating condensed carbon dioxide from methane gas, comprising a feed point that is between the bottom and the middle of the column (figure 1). It would have been obvious to one having ordinary skill in the art at the time of the invention to select a feed point that will provide the most efficient level of gas/liquid contact in the column in order to achieve a desired and economical separation of methane and carbon dioxide.

***Response to Arguments***

7. Applicant's arguments filed July 13, 2005 have been fully considered but they are not persuasive. Applicant argues that the major difference between O'Brien et al. '612 and the instant claims is that the cryogenic distillation separator column and process of the patent does not anticipate the absorbing steps of the instant invention. It is submitted that although the process temperature in the O'Brien column is lower than a traditional absorber, the physical

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process of absorption will inherently take place in the column. Similarly, the prior column meets the structural limitations of the apparatus claims because it contains contact stages and is capable of performing traditional counter-current absorption because carbon dioxide is liquefied in the low temperature upper region of the column and flows downward, contacting gaseous impurities entering the column and carrying them out in a product stream (claim 1-c). An embodiment of the instant invention is that carbon dioxide is condensed at the top of the absorber column and flows downward to absorb impurities (page 8, lines 8-20). Although the instant specification discusses the advantages of using higher temperatures and a single pass absorption process over normal cryogenic distillation, no limitations are claimed that distinguish the absorption from the distillation contacting in the patent. Note also that the patent suggests introducing recompressed carbon dioxide permeate into a desired portion of the column, although the indicated dotted line has not been illustrated (col. 8, lines 22-33). With respect to the Burr '841 patent, one having skill in the art would have found it obvious to locate the feed point of a cryogenic distillation column at an appropriate position.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank M. Lawrence whose telephone number is 571-272-1161. The examiner can normally be reached on Mon-Thurs 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Frank M. Lawrence  
Primary Examiner  
Art Unit 1724

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*Frank Lawrence*  
8-9-05